

CONTAMINATION

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SCOPE

- CLASSES OF MATERIALS DID NOT SEEM APPROPRIATE FOR THIS ENVIRONMENTAL ISSUE
- WORKING GROUP CHOSE TO ACCEPT S/C SYSTEMS FOR SUBSYSTEMS AS THE MOST VULNERABLE
 - OPTICAL SYSTEMS
 - = SENSORS
 - = REFLECTIVE/REFRACTIVE OPTICS
 - THERMAL CONTROL SYSTEMS
 - SOLAR POWER
- ALL ORBITS NEED TO BE CONSIDERED
- CONCERNS ARE
 - CHANGES IN TRANSMITTANCE OF OPTICS
 - RADIATIVE PROPERTIES OF COATINGS

ISSUES

- WHICH MATERIALS OR CLASSES OF MATERIALS ARE MOST VULNERABLE? IN WHAT ORBITS? WHY? CAN GENERAL OR SPECIFIC CONSEQUENCES FOR LONG-TERM S/C OR SATELLITE PERFORMANCE BE IDENTIFIED?
- IS THERE ANY CORRELATION BETWEEN THEORY AND LAB EXPERIENCE (AND SPACE EXPERIENCE) SO THAT LONG-TERM PERFORMANCE CAN BE PREDICTED?
 - SOME THEORY/LABORATORY CORRELATIONS HAVE BEEN DEMONSTRATED
- DO WE KNOW ENOUGH, EVEN IF ONLY EMPIRICALLY, TO LAUNCH FOR 10 YEARS (OR 30 YEARS) OF SERVICE WITH CONFIDENCE?
 - VERY SHORT TERM DATA AVAILABLE
 - NOT ENOUGH CONFIDENCE FOR 10-YEAR LIFETIME

TERRESTRIAL LABORATORY FACILITIES

- AVAILABILITY OF LABORATORY SIMULATION FACILITIES
 - OUTGASSING - YES
 - PLUMES - NO
 - EFFECTS - PARTIAL

INTERACTION/SYNERGISM OF ENVIRONMENTAL EFFECTS

- IS SYNERGISM LIKELY? YES
- HAS SYNERGISM BEEN EVALUATED? IN A FEW CASES
- DO LABORATORY FACILITIES EXIST TO ASSESS SYNERGISM? VERY LIMITED FACILITIES
- SPACE EXPERIMENTS ARE REQUIRED; GROUND FACILITIES CANNOT SIMULATE ALL ENVIRONMENTAL CONDITIONS SIMULTANEOUSLY

REQUIRED SPACE EXPERIMENTS

- HIGH PRIORITY:
 - PLUME FLOWFIELD/CONTAMINATION
 - MOLECULAR BACKSCATTER

(NOTE: BOTH HIGH PRIORITY EXPERIMENTS COULD BE CONTAINED IN ONE PACKAGE - VOLUME $\sim 0.6 \text{ m}^3$, MASS $\sim 500 \text{ LBS.}$)

- MEDIUM TO HIGH PRIORITY:
 - PARTICLE RELEASE, DETECTION, AND REMOVAL

PLANNED AND DEPLOYED SPACE EXPERIMENTS

- SPACE SHUTTLE
 - IBS/SPAS (DEPLOY AND RECOVERY)
 - STAR LAB
 - CIRRIIS (IR TELESCOPE)
 - LDEF (DEPLOY AND RECOVERY)
 - IFCE (BACKSCATTER; NASA/ESA)
 - EOIM III
 - SPACE (DEPLOY AND RECOVERY)
- FREE FLYER:
 - P-888 (TEAL RUBY, IAPS, UV) SHUTTLE LAUNCH
 - SSTS NTFE (PROPOSED NEAR TERM FLIGHT EXPERIMENT)
 - SPIRIT II, III
 - DELTA STAR
 - GAS EJECTION PACKAGE

PLANNED AND DEPLOYED SPACE EXPERIMENTS **(CONTINUED)**

- STS PLATFORMS
 - GAS CAN
 - MPSS
 - HITCHHIKER G
 - SPAS
 - CTM (COLLAPSIBLE TUBE MAST)

SHUTTLE PACKAGE

- IOCM
- APM
- CMP II
- PACS

SPACE EXPERIMENT INSTRUMENTATION

- TQCM, CQCM
- CALORIMETER
- RODIOMETER
- MASS SPECTROMETER
- CAMERAS
 - VISIBLE (FILM, ELECTRONIC)
 - UV
 - IR
- SCATTEROMETERS
- PARTICLE DETECTORS
 - FLUX COUNTER
 - FOV SPIR
- PRESSURE/DENSITY GAGES

SPACE EXERIMENT

MOLECULAR

- E.1. PRIORITY
2. DURATION
 3. RETRIEVAL

- F.1. VOLUME
2. WEIGHT
 3. ASE/GSE
 4. PLATFORM
CHARACTERS

- G.1. PLANNED
2. DESIGNED
 3. BUILT

TRANSPORT	BACK SCATTER	SYNERGISTIC DEPOSITION RATES	REEMISSIONS	EFFECTS